

REMARKS

The Examiner rejects claim 1 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement set forth therein; rejects claims 1, 2, and 4-23 under 35 U.S.C. § 112, second paragraph, as being indefinite; and rejects claims 1, 2, and 4-23 under 35 U.S.C. §102(e) as being anticipated by FERGUSON et al. (U.S. Patent No. 6,798,777).

Applicants amend claims 1, 2, 4, 6, 7, 9-13, 16, 17, 19, 22, and 23 to improve form, and cancel claims 5 and 8 without prejudice or disclaimer. No new matter is added by way of the amendment. Claims 1, 2, 4, 6, 7, and 9-23 remain pending. Applicants respectfully traverse the rejections.

35 U.S.C. §112, First Paragraph Rejection

Claim 1 stands rejected under 35 U.S.C. § 112, first paragraph, as allegedly reciting subject matter that is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that Applicants had possession of the claimed invention at the time the application was filed (Office Action, p. 2). Specifically, the Examiner alleges that the recitations, “before receiving the first information” and “before receiving the second information” are not sufficiently described in the specification (Office Action, pp. 2-3). Applicants respectfully traverse the rejection.

While not acquiescing in the Examiner’s rejection, but merely to expedite prosecution, claim 1 has been amended to improve form and more clearly define the claimed subject matter. In particular, amended claim 1 recites, in part, processing “second data before the requested first information is received from the agent,” and resuming processing “of the first data after the requesting of the second information.” Applicants respectfully submit that support for the cited claim language can be found throughout the specification. Applicants refer the Examiner, for

example, to Fig. 5 and the accompanying text in the specification. For example, Fig. 5 depicts processing P1 (“second data”) before the requested D0 (“first information”) is received from Agent 1 (“the agent”), and resuming processing of P0 (“the first data”) at time 520 after the requesting of D1 (“the second information”).

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 112, first paragraph.

35 U.S.C. §112, Second Paragraph Rejections

Pending claims 1, 2, 4, 6, 7, and 9-23 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to point out and distinctly claim the subject matter which Applicants regard as the invention (Office Action, p. 3). Specifically, the Examiner asserts that various claim language renders the claims “unclear” (Office Action, pp. 3-6). Applicants respectfully traverse the rejection.

While not acquiescing in the Examiner’s rejection, but merely to expedite prosecution, claims 1, 2, 6, 7, 9, 10-13, 16, 17, 19, 22, and 23 have been amended to improve form and more clearly define the claimed subject matter.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 4, 6, 7, and 9-23 under 35 U.S.C. § 112, second paragraph.

35 U.S.C. §102 Rejections

Pending claims 1, 2, 4, 6, 7, and 9-23 stand rejected under 35 USC §102(e) as allegedly anticipated by FERGUSON et al. Applicants respectfully traverse the rejection.

A proper rejection under 35 U.S.C. § 102 requires that a single reference teach every aspect of the claimed invention. Any feature not directly taught must be inherently present. In other words, the identical invention must be shown in as complete detail as contained in the

claim. See M.P.E.P. § 2131. FERGUSON et al. does not disclose each and every feature recited in claims 1, 2, 4, 6, 7, and 9-23.

Independent claim 1, as amended, is directed to a method of performing route lookups for a plurality of data received via a network. The method comprises processing, by a processor, first data to generate routing information for the first data until it is anticipated that first information is needed to continue the processing of the first data, a first partial processing result or a first process state being obtained for the first data; requesting, by the processor, the first information from an agent associated with the processor; causing, by the processor, a storing of first context state information corresponding to the first partial processing result or the first process state; processing, by the processor, second data before the requested first information is received from the agent to generate routing information for the second data, until it is anticipated that second information is needed to continue the processing of the second data, a second partial processing result or a second process state being obtained for the second data; requesting, by the processor, the second information from the agent or another agent associated with the processor; causing, by the processor, a storing of second context state information corresponding to the second partial processing result or the second process state; receiving, by the processor, the requested first information from the agent; and resuming processing, by the processor, of the first data after the requesting of the second information using the stored first context state information and the received requested first information. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose processing first data to generate routing information for the first data until it is anticipated that first information is needed to continue the processing of the first data, a first partial processing result or a first process state

being obtained for the first data, as required by amended claim 1. The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 6). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. recites:

In another aspect the invention provides a method for performing a lookup in a switching device. The method includes identifying a first lookup operation in a sequence of lookup operations to be performed on a packet, executing the first lookup operation including returning a result that is a pointer to a subsequent lookup operation in the sequence, executing the subsequent lookup including returning a result that is a pointer to a next lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed and when a result indicates that no more operations are to be processed, returning a notification to the switching device that includes routing information for the routing of the packet through the switching device.

This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does FERGUSON et al. disclose processing first data until it is anticipated that first information is needed to continue the processing of the first data, a first partial processing result or a first process state being obtained for the first data, as required by amended claim 1.

For at least the foregoing reasons, Applicants submit that claim 1 is not anticipated by FERGUSON et al.

Claims 2 and 4 depend from claim 1 and are, therefore, not anticipated by FERGUSON et al. for at least the same reasons given with respect to claim 1.

Independent claim 6, as amended, is directed to a method of processing packet information for routing packets received via a network. The method comprises processing, by a processor, first data related to routing of a first received packet; determining that additional information associated with the first data will be needed to complete the processing; discontinuing, based on the determination, the processing of the first data to form intermediate processing information; requesting, by the processor, the additional information from an agent associated with the processor; storing, by the processor, the intermediate processing information related to the processing of the first data; and processing, by the processor, second data related to routing of a second received packet while waiting for the requested additional information from the agent. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose determining that additional information associated with the first data will be needed to complete the processing, and based on the determination, discontinuing the processing of the first data to form intermediate processing information, as required by amended claim 6. The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 8). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. is reproduced above. This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does FERGUSON et al. disclose determining that additional information associated with the first data

will be needed to complete the processing, and based on the determination, discontinuing the processing of the first data to form intermediate processing information, as required by amended claim 6.

For at least the foregoing reasons, Applicants submit that claim 6 is not anticipated by FERGUSON et al.

Claim 7 depends from claim 6 and is, therefore, not anticipated by FERGUSON et al. for at least the same reasons given with respect to claim 6.

Independent claim 9, as amended, is directed to a method for routing packets received at a network device using corresponding data structures into which the received packets are converted. The method comprises forwarding, using forwarding logic of the network device, the data structures to a plurality of processing engines of the network device; monitoring, by a monitor of the network device, respective processing states of the plurality of processing engines to identify partial processing results based on halted processing of the data structures by the processing engines in advance of a need for additional processing information for continued processing of the data structures; performing, at each processing engine, concurrent route lookups for at least two of the data structures using the partial processing results for the data structures; modifying, at the processing engines, the data structures based on the route lookups; and routing, using a switch fabric of the network device, the packets based on the modified data structures. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose monitoring respective processing states of the processing engines to identify partial processing results based on halted processing of the data structures by the processing engines in advance of a need for additional processing information for continued processing of the data structures, as required by amended claim 9.

The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 9). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. is reproduced above. This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does FERGUSON et al. disclose monitoring respective processing states of the processing engines to identify partial processing results based on halted processing of the data structures by the processing engines in advance of a need for additional processing information for continued processing of the data structures, as required by amended claim 9.

For at least the foregoing reasons, Applicants submit that claim 9 is not anticipated by FERGUSON et al.

Claims 10-12 depend from claim 9 and are, therefore, not anticipated by FERGUSON et al. for at least the same reasons given with respect to claim 9.

Independent claim 13, as amended, is directed to a network device that comprises an input portion configured to receive data structures formed from data streams received via a network and to transmit data items associated with the data structures. The network device also comprises a plurality of processing engines, each processing engine being configured to receive a plurality of data items from the input portion, and contemporaneously compute routes for the data items by performing a set of computations. The processing engines comprise a data processor configured to at least partially calculate a route for a first data item based on a partial

result of less than the entire set of computations due to an impending need for computation information which is identified for performing one or more of the computations of the set, and a functional control state machine configured to control operation of the data processor by maintaining a route computation state that the data processor can access to calculate the route for the first data item based on information from the partially calculated route. The network device also comprises a resource configured to receive requests from the plurality of processing engines for the computation information; a result processor configured to modify the data structures to include information on the routes computed by the plurality of processing engines; and a memory configured to store route computation states or the partially calculated route for at least one of the plurality of processing engines. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose a data processor configured to at least partially calculate a route for a data item based on a partial result of less than the entire set of computations due to an impending need for computation information which is identified for performing one or more of the computations of the set, as required by amended claim 13. The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 10). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. is reproduced above. This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does

FERGUSON et al. disclose a data processor configured to at least partially calculate a route for a data item based on a partial result of less than the entire set of computations due to an impending need for computation information which is identified for performing of one or more of the computations of the set, as required by amended claim 13.

For at least the foregoing reasons, Applicants submit that claim 13 is not anticipated by FERGUSON et al.

Claims 14-18 depend from claim 13 and are, therefore, not anticipated by FERGUSON et al. for at least the same reasons given with respect to claim 13.

Independent claim 19 is directed to a system for performing concurrent route lookups for processing a plurality of data items. As amended, the system comprises a data processing portion configured to process one data item at a time and to pipeline data requests to a memory that stores information needed for the processing to thereby substantially eliminate idle time of the data processing portion associated with discontinuous processing of the one data item due to a request for the stored information; a control state portion to monitor operation of the data processing portion by receiving state information related to a partial result produced from the discontinuous processing of the one data item by the data processing portion based on a prospective request for the stored information; a buffer configured to store the partial result; and a controller configured to load the partial result from the data processing portion into the buffer and to input another data item into the data processing portion for processing while requested data is obtained for the one data item. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose a control state portion to monitor operation of a data processing portion by receiving state information related to a partial result

produced from a discontinuous processing of the one data item by the data processing portion based on a prospective request for stored information, as required by amended claim 19. The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 11). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. is reproduced above. This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does FERGUSON et al. disclose a control state portion to monitor operation of the data processing portion by receiving state information related to a partial result produced from the discontinuous processing of the one data item by the data processing portion based on a prospective request for the stored information, as required by amended claim 19.

For at least the foregoing reasons, Applicants submit that claim 19 is not anticipated by FERGUSON et al.

Claims 20-22 depend from claim 19 and are, therefore, not anticipated by FERGUSON et al. for at least the same reasons given with respect to claim 19. Claims 20-22 are also not anticipated by FERGUSON et al. for reasons of their own.

For example, claim 22 recites that the data processing portion includes a state machine configured to interact with the data processing portion and to inform the controller when the data processing portion will be requesting data from the memory, as required by amended claim 22. FERGUSON et al. does not disclose this feature. The Examiner identified col. 43, line 58 – col.

44, line 7 of FERGUSON et al., as support for the rejection (Office Action, page 12). Applicants respectfully traverse.

Col. 43, line 58 – col. 44, line 7 of FERGUSON et al. discloses:

Output requests to an individual memory bank are processed strictly in order. That is, the multi-function multiport may track each request issued to a memory bank (through the read request queues) and is assured that the data received in response to a series of requests to the same memory bank will be strictly delivered according to the sequence or pattern in which they were issued. Output request processor 306 keeps track of requests generated for each memory bank through the use of reply queues (not shown). The request queue contains a stream number and a read address. When a request is issued to memory, the entry is removed from the request queue and the stream number portion is placed in an associated reply queue. When a reply is received, the entry at the head of the reply queue is removed and the reply is sent to the stream number (in stream output buffer 312) indicated by the stream number retrieved from the reply queue.

This portion of FERGUSON et al. discloses that a multi-function multiport may track each request issued to a memory bank (through the read request queues) and is assured that the data received in response to a series of requests to the same memory bank will be strictly delivered according to the sequence or pattern in which they were issued. Nowhere in this portion or elsewhere does FERGUSON et al. disclose a state machine configured to interact with the data processing portion and to inform the controller when the data processing portion will be requesting data from the memory, as required by amended claim 22.

For at least these additional reasons, Applicants submit that claim 22 is not anticipated by FERGUSON et al.

Independent claim 23, as amended, is directed to a system that comprises means for processing data structures to generate routing information and for requesting information from a source external to the means for processing when the information is projected to be needed to accomplish the processing of the data structures, the requesting suspending a processing of one

of the data structures to form partial results produced by the suspended processing; means for monitoring operation of the means for processing via state information associated with the partial results produced by the means for processing; means for storing the partial results from the means for processing at least until such time as the requested information becomes available to the means for processing; and means for loading the partial results into the means for storing and loading another data structure into the means for processing upon the suspension of the processing of the one data structure, and for loading the partial results into the means for processing after the requested information becomes available and the processing of the other data structure is halted. FERGUSON et al. does not disclose this combination of features.

For example, FERGUSON et al. does not disclose means for processing data structures and requesting information from a source external to the means for processing when the information is projected to be needed to accomplish the processing, the requesting suspending a processing of one of the data structures to form partial results produced by the suspended processing, as required by amended claim 23. The Examiner identified col. 2, line 64 – col. 3, line 11 of FERGUSON et al., as support for the rejection (Office Action, page 13). Applicants respectfully traverse.

Col. 2, line 64 – col. 3, line 11 of FERGUSON et al. is reproduced above. This portion of FERGUSON et al. discloses a lookup method that includes executing a lookup operation in a sequence of lookup operations to be performed on a packet, including returning a result that is a pointer to a subsequent lookup operation in the sequence, continuing to execute lookup operations in the sequence until a lookup operation in the sequence returns a result that indicates that no more operations are to be processed. Nowhere in this portion or elsewhere does FERGUSON et al. disclose means for processing data structures and requesting information

from a source external to the means for processing when the information is projected to be needed to accomplish the processing, the requesting suspending a processing of one of the data structures to form partial results produced by the suspended processing, as required by amended claim 23.

For at least the foregoing reasons, Applicants submit that claim 23 is not anticipated by FERGUSON et al.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 4, 6, 7, and 9-23 under 35 USC §102(e) based on FERGUSON et al.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of the application and the timely allowance of pending claims 1, 2, 4, 6, 7, and 9-23.

As Applicants' remarks with respect to the Examiner's rejections overcome the rejections, Applicants' silence as to certain assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, etc.) is not a concession by Applicants that such assertions are accurate or that such requirements have been met, and Applicants reserve the right to dispute these assertions/requirements in the future.

If the Examiner believes that the application is not now in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned to discuss any outstanding issues.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

HARRITY SNYDER, L.L.P.

By: /Garth D. Richmond/
Garth D. Richmond
Registration No. 43,044

Date: August 15, 2006

11350 Random Hills Road
Suite 600
Fairfax, Virginia 22030
(571) 432-0800